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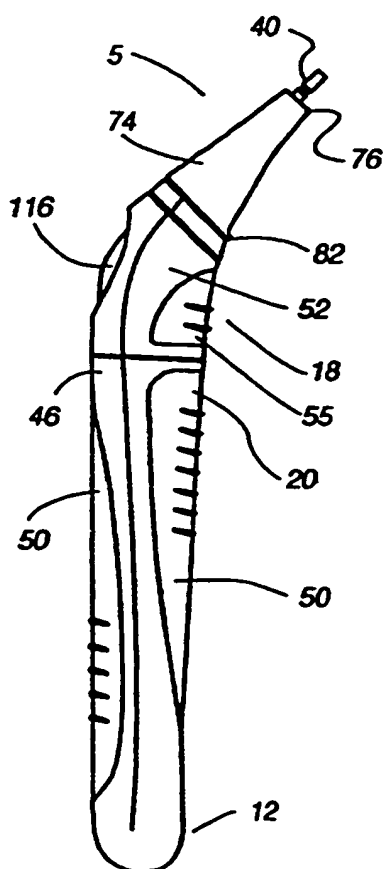
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[Continued on next page]

(54) Title: INTERPROXIMAL FLOSSER HANDLE



(57) Abstract: A handle housing (5) that is modular and easily assembled and disassembled for maintenance and cleaning. The handle housing (5) has an integrally-formed orientation shape (e.g. S-shape) to keep it from tipping onto the flossing tip (122). The handle housing (5) also includes the rocker arm (40), cam drive (38) (together the drive train), motor (22), power supply (120) and bobbin (112) for full functionality, with linear, reciprocating motion created by the drive train for effective cleaning.

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## INTERPROXIMAL FLOSSER HANDLE

### RELATED APPLICATIONS

This application is a conversion of U.S. Provisional Patent Application  
Serial No. 60/171,825 filed December 21, 1999, from which priority is  
5 claimed.

### FIELD OF THE INVENTION

This invention relates to an oral hygiene device handle and accessories,  
and particularly to an interproximal flosser handle having a modular  
component design with a removable shroud and an integrally formed resting  
10 surface.

### BACKGROUND

Hand held oral hygiene devices are becoming more popular. These  
devices include electric toothbrushes and flossers. It is important that the  
handles for these devices are comfortable, allow adequate access to one's  
15 mouth, include designs that protect the devices from contamination, and are  
convenient to assemble.

Two substantially half-shells typically forms oral hygiene handles, each  
representing a longitudinal half of the flosser handle. Opening this type of  
handle for any reason, such as replacing the battery, can result in the exposure  
20 of several components not requiring exposure, such as the motor and internal  
working linkages. This can lead to damage to the internal components, as  
well as structurally limit the style of the handle. There is a need for an oral  
hygiene device handle that can be opened to replace the device batteries  
without exposing the device internal components.

25 Typical designs of oral hygiene devices, when set on the counter, can  
tip over, causing the tip to contact the support surface and possibly  
contaminate the device end. There is a need for an oral hygiene device handle

A preferred embodiment of the present invention oral hygienic device handle is used in an interproximal flossing device. The interproximal flossing device handle housing also includes the rocker arm, cam drive (together the drive train), motor, power supply and bobbin for full functionality, with preferably linear, reciprocating motion created by the drive train for effective cleaning.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front perspective view of an interproximal flosser, according to one embodiment of the present invention;

10 Fig. 2 is a left side elevation view of the flosser in Fig. 1, with the right side elevation being a mirror image thereof;

Fig. 3 is a back side elevation taken along line 4-4 of the flosser in Fig. 1;

Fig. 4 is a section view of the flosser in Fig. 3;

15 Fig. 5 is a is an exploded view of the flosser in Fig. 1;

Fig. 6 is a is a section view taken along line 6-6 of the flosser in Fig. 1;

Fig. 7 is a top view of a handle portion of an interproximal flosser, according to one embodiment of the present invention;

Fig. 8 is a section view taken along line 8-8 of the handle in Fig. 7;

20 Fig. 9 is a top view of a chassis portion of an interproximal flosser, according to one embodiment of the present invention;

Fig. 10 is a section taken along line 10-10 of the chassis in Fig. 9;

Fig. 11 is a perspective view of a lower housing portion of an interproximal flosser, according to one embodiment of the present invention;

25 Fig. 12 is a top view of the lower housing portion in Fig. 11;

Fig. 13 is a section view taken along line 13-13 of the lower housing portion of Fig. 12;

Fig. 14 is a back side view of an upper housing portion of an interproximal flosser, according to one embodiment of the present invention;

which extends about two-thirds of the way toward the tip end. Near the tip end, the handle housing becomes roughly triangular in shape and bends to one side approximately 30-50 degrees. At the tip end, the handle housing begins reducing in dimension toward the tip end until the three general sides of the triangular shape converge to an aperture 16, through which the end 36 of the drive mechanism 34 extends for receiving the flosser tip 122. For description purposes, the side towards which the handle housing bends is the front of the flosser handle housing, and the side from which the handle housing bends away is the back or rear of the flosser handle housing.

10       The bend forms an angle or elbow 18, with the on-off push button switch 116 on the rear side of the housing 10, and positioned near the intersection of the bend. Preferably, the handle housing is held in the user's hand with the index finger operating the on-off switch 116. This switch position facilitates the proper holding and actuation of the switch. When the switch is depressed, the motor 22 is energized by the power source 118 (such as an AA battery 120) and actuates the drive mechanism 34. The drive mechanism includes a cam drive 38 and a rocker arm 40 for translating the rotational movement of the motor's drive shaft 39 into a linear up-and-down pivoting movement at the end of the drive mechanism extending from the handle housing. This motion drives the flossing tip 122 in a planar, reciprocating motion to clean between teeth, and between teeth and gums. When the switch 116 is not depressed, the motor 22 stops.

25       The handle housing 10 is made of modular components constructed of any material, such as plastic, that has the required structural characteristics. The handle housing includes a handle 46, a lower housing 52, an upper housing 58, a hygienic sleeve 72, and a shroud 74 (See Fig. 5).

      The handle 46 is best shown in Figs. 5, 7, and 8. The handle has a shape that changes from a generally oval or cylindrical shape at its bottom or base end 12 to a slightly triangular (preferably isosceles) configuration. The

open top end 48 of the handle 46. The joiner portion has preferably two o-ring seals 104 formed thereon. The open top end of the handle fits over the joiner portion, and over the seals, to secure the handle thereto in a substantially water-tight manner. The o-ring seals create a tight fit sufficient to keep the handle from unintentionally disconnecting from the lower housing portion 52. The lower housing similarly slides over the top 103 of the joiner 102 to meet the top end 48 of the handle 46. Extending from the top end of the joiner portion at an angle of 0-50 degrees is the top end portion 106 of the chassis 86. The top end portion of the chassis is a semi-circular channel 108 configured to hold the motor 22. The top end portion 106 also includes two detents 110 for receiving tab portions 26 of a motor cover 24.

Fig. 5 discloses the motor cover. The motor cover includes two bottom tabs 26 (only one shown) for securing the cover to the top end portion detents 110. The top 28 of the motor cover 24 includes a groove 30 for attaching the switch contact 100. The motor cover is generally configured to fit within the lower housing 52 of the flosser 5.

Extending from the top end 28 of the motor 22 and motor cover 24 is a cam driver 38. Fig. 5 discloses one embodiment of the cam driver for use on the end of the drive shaft 39 of the electric motor 22. It engages the "ball" end 126 of the rocker arm 40 and along with the pivot structure 130, and acts to convert the rotation of the electric motor to substantially linear reciprocating motion. The operation of the drive mechanism 34 is described in U.S. Patent Application Serial No. 09/636488, filed 10 August 2000, and is incorporated by reference above.

The handle housing 10 next includes a lower housing 52, best seen in Fig. 5 and 11-13. The bottom end 56 of the lower housing 52 attaches to the chassis joiner 102 to be positioned in close engagement with the top, open end 48 of the handle 46. The top end 48 of the handle and the bottom end 56 of the lower housing 52 contact each other and entirely cover up the

arm there between. The arms 132 allow the rocker arm tabs 44 to be snapped into the key-shaped openings 133 on the arms.

As mentioned above, the upper end 70 of the upper housing 58 is covered by a tightly fitting boot 134 (made of a resilient material, such as rubber or plastic) that resists fluids from entering the interior of the handle housing 10 through the upper end 70 of the upper housing 58. See Figs. 1 and 17-19. In the embodiment in Figs. 17-19, the bottom end portion 136 is larger in diameter than the top end portion 138 to allow the boot 134 to fit over both the narrow top end 70 and wider bottom end 60 of the upper housing 58.

Depending on the material used in constructing the boot 134, the boot could have end portions with equivalent diameters. A more flexible material could tightly fit around varying sized cross-sections of the upper housing. In the embodiment in Figs. 17-19, the bottom end portion 136 of the boot is configured to fit around the bottom end portion 60 of the upper housing 58. The interior of the boot includes an annular raised edge portion configured to releasably engage an annular seat or groove 66 formed in the upper housing exterior surface 64. This engagement helps keep the boot 134 tightly in place. The top end portion 138 of the boot is configured to fit tightly around the rocker arm 40 above the pivot point portion 128 of the arm. The boot is removable for cleaning, and helps keep the rocker arm mechanism clean and dry. A removable tip shroud 74 covers the boot and upper housing.

A tip shroud is removably attached to the upper housing 58 near the bottom end 60 of the upper housing and covers the boot 134 and upper housing. See Figs. 5 and 20-23. The tip shroud is a relatively rigid hygienic sleeve, and covers the majority of the upper housing above the bottom end of the upper housing. The tip shroud has the same basic outer shape (substantially triangular) as the base of the upper housing, and converges to form the aperture 76 through which the end 36 of the drive mechanism 34

then positioned over the top end 70 of the upper housing, and the hygienic shroud 74 is then attached over the top end of the upper housing and the boot.

For maintenance and cleaning, the handle 46 can be removed to replace the battery 120, and the tip shroud 74 can be removed to clean or rinse the upper housing 58 and tip 36 of the drive mechanism 34, and to be replaced for  
5 different users. This structure is very convenient for both assembly and cleaning/maintenance.

The handle housing 10 defines a curved shape along the sides. See Figs. 1-3. The length of this intersection (considering only one in this  
10 description, the other is identical) forming the curved shape is substantially in one plane and extends from the bottom end of the handle 46, along the length of the handle, through the length of the lower housing 52, along the base end 60 of the upper housing 58, and terminates near the base of the shroud 74. Preferably, the curved shape has a dual curve (such as an "S" shape), but  
15 could include a single curve or more than two curves.) It could also include the use of three discrete, non-continuous points to define a plane.

This single-plane feature (curved, continuous, or discrete) supports the handle housing 10 on its side to keep the flossing tip 122 from contacting the surface on which the flosser 5 is sitting. In the S-shaped embodiment, this  
20 planar feature extends laterally both to the front (on the lower housing 52, upper housing 58, and shroud 74), and to the back (on the handle 46) of the handle housing to define a plane (three points define a plane). This shape feature keeps the handle housing from tipping toward its front side 20 when set on a flat surface, and thus keeps the flossing tip 122 from contacting the  
25 surface. Also, the handle housing automatically rolls to the S-shaped side when placed in a different orientation on the flat support surface and thus "rights" itself.

This orienting curved shape surface is preferably formed integrally with the handle housing and blends nicely with the general aesthetics of the handle

CLAIMS

What is claimed is:

1. An interproximal flossing device comprising:  
a handle housing;  
a motor;  
5 a drive train;  
a flossing tip;  
a power supply;  
said flossing tip attached to said drive train;  
said motor, drive train, and power supply positioned in said  
10 housing and operably connected to move said flossing tip; and  
wherein said handle housing defines at least one orienting  
surface thereon to keep said flossing tip from contacting a support surface  
upon which the flossing device rests.
2. A device as defined in claim 1, wherein said orienting surface  
extends along said handle housing.
3. A device as defined in claim 1, wherein said orienting surface  
extends along opposing sides of said handle housing.
4. A device as defined in claim 2, wherein said orienting surface is  
S-shaped.
5. A device as defined in claim 1, wherein said handle housing  
comprises:  
a handle;  
a lower housing;  
5 an upper housing; and  
a boot covering at least a portion of said upper housing.
6. A device as defined in claim 5, further comprising:  
a shroud for snugly fitting over at least a portion of said upper  
housing; and all of said boot.



15. A handle for a device having an operable end comprising:  
a handle housing;  
wherein said handle housing defines at least one orienting  
surface thereon to keep said operable end from contacting a support surface  
5 upon which the device rests.
16. A device as defined in claim 15, wherein said orienting surface  
extends along said handle housing.
17. A device as defined in claim 15, wherein said orienting surface  
extends along opposing sides of said handle housing.
18. A device as defined in claim 16, wherein said orienting surface  
is S-shaped.
19. A device as defined in claim 15, wherein said orienting surface  
is configured to automatically right said device from a position where said  
operable end is in contact with said support surface to a position where said  
operable end is not in contact with said support surface.

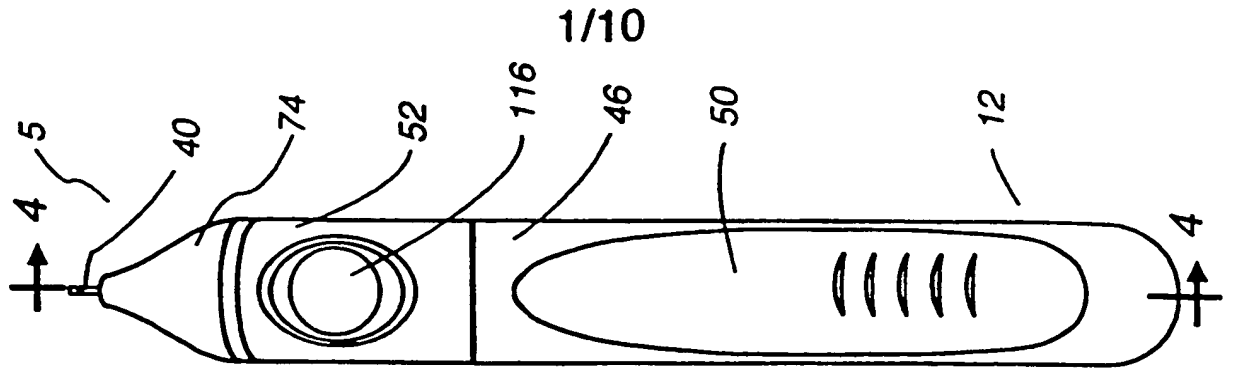


Fig. 3

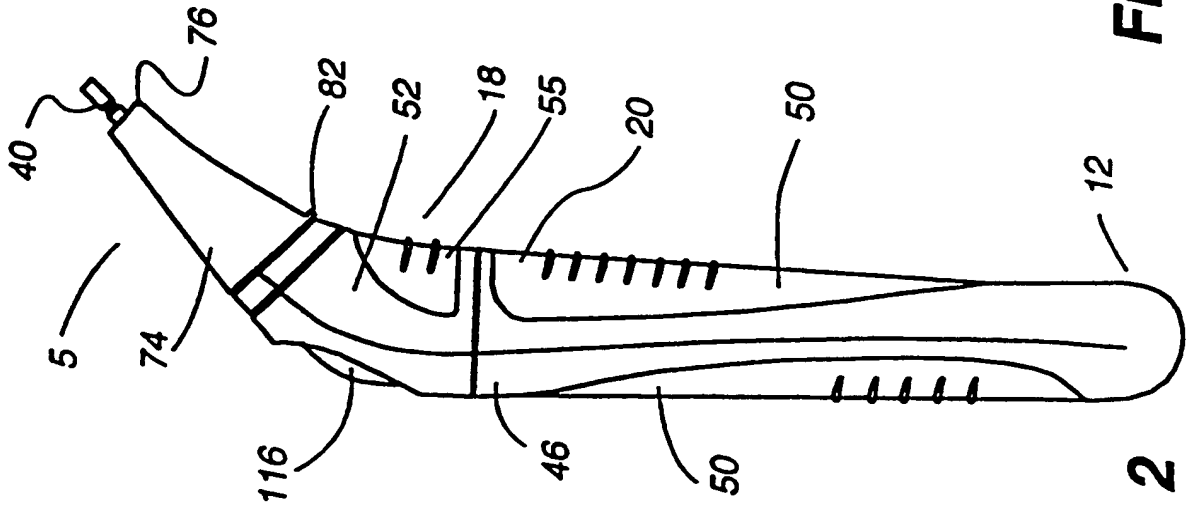


Fig. 2

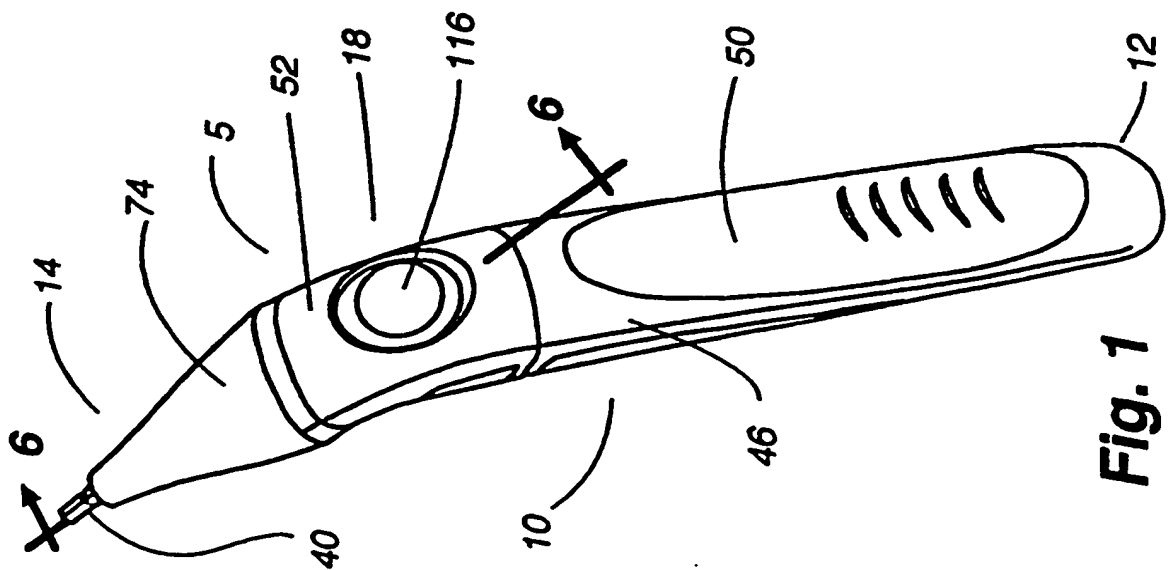
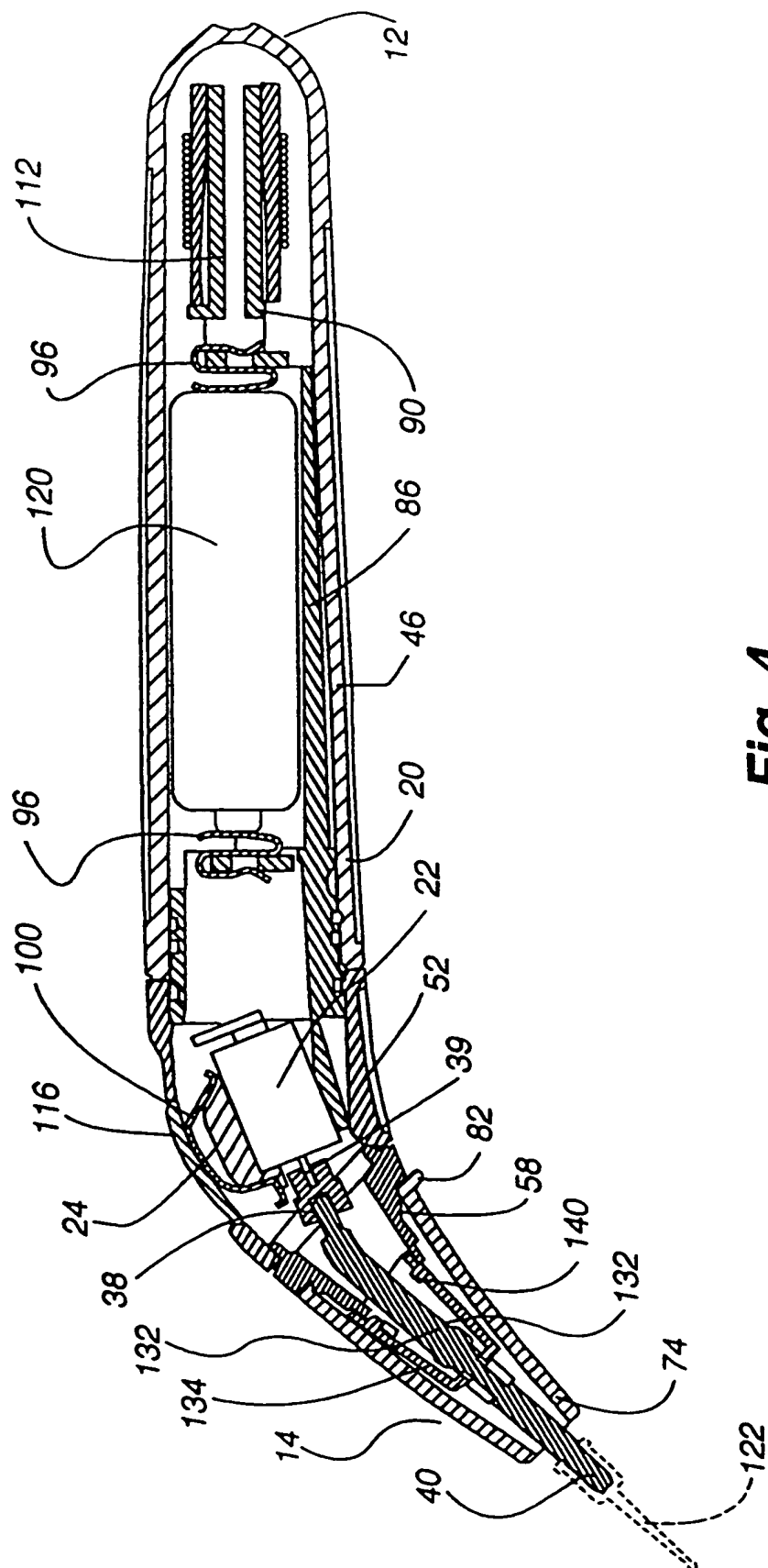
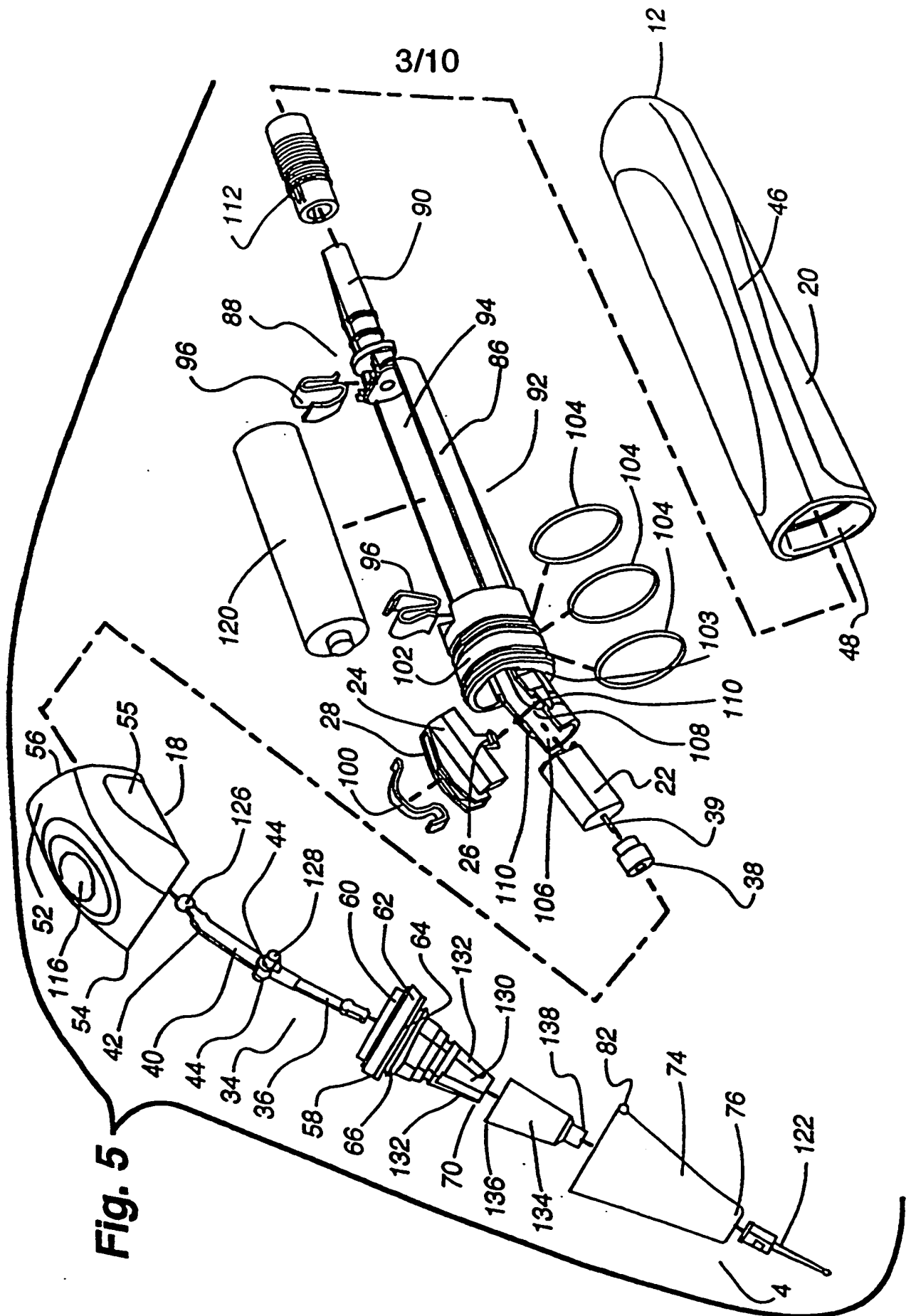


Fig. 1



**Fig. 4**



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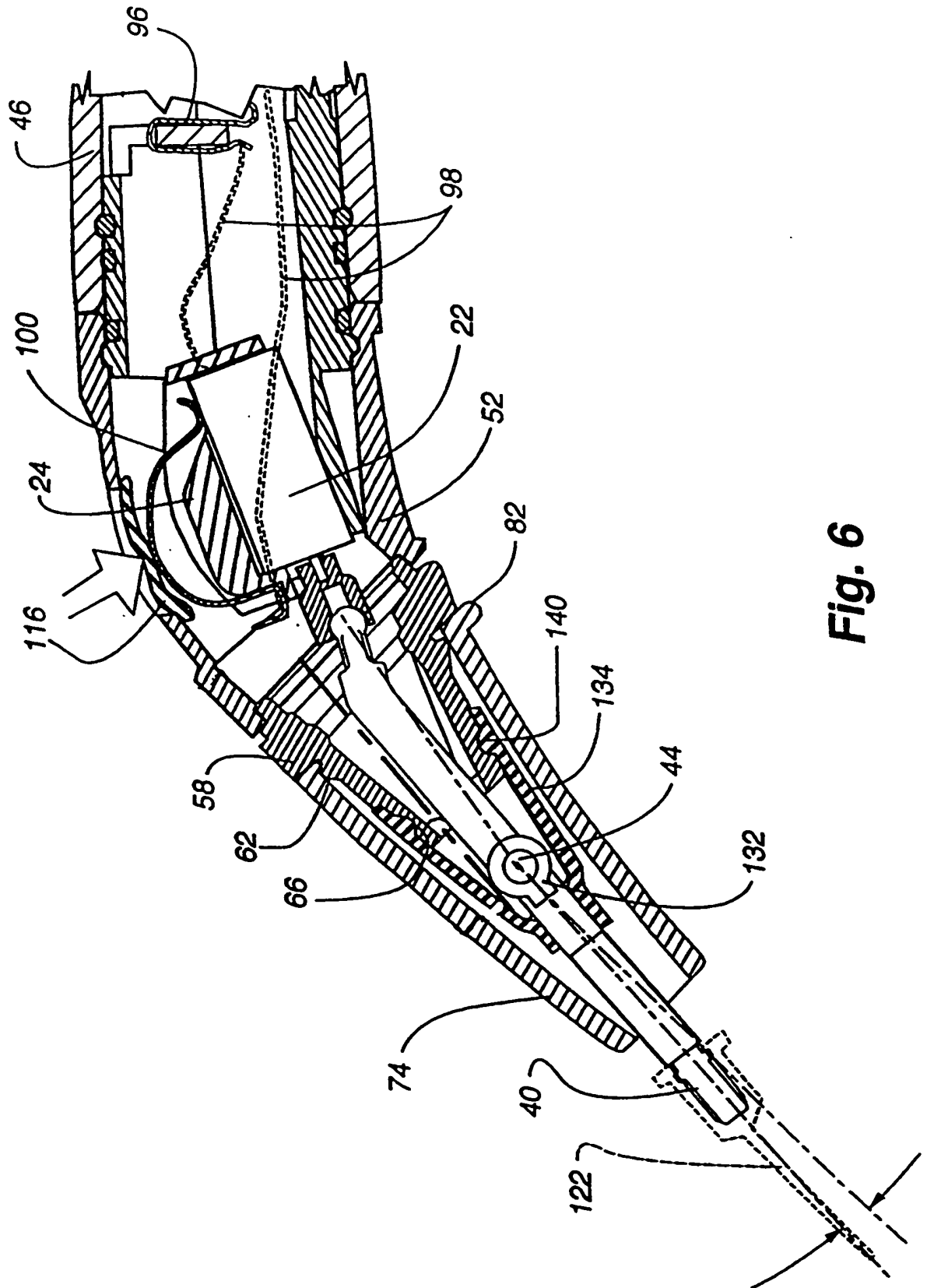
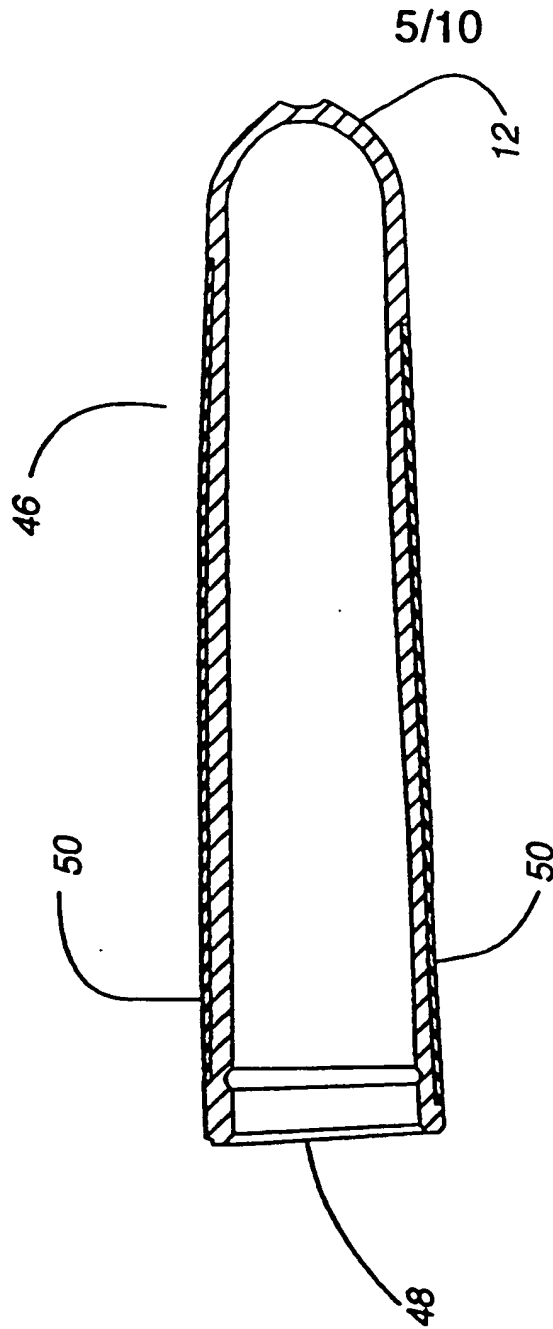
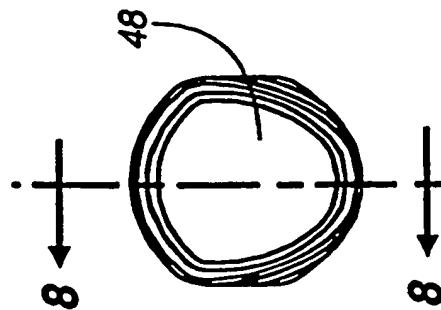


Fig. 6

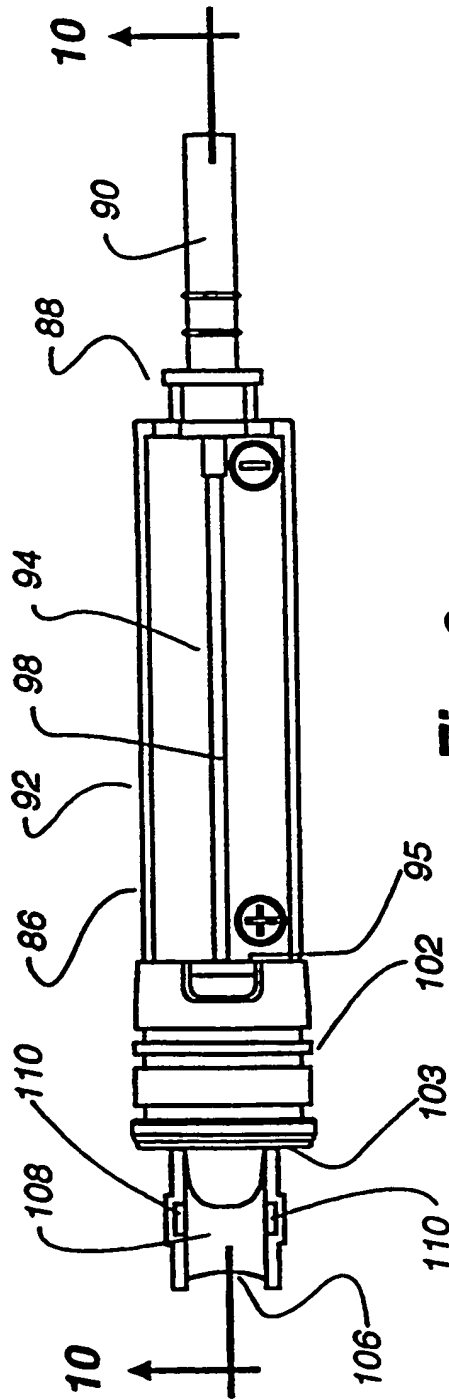


**Fig. 8**

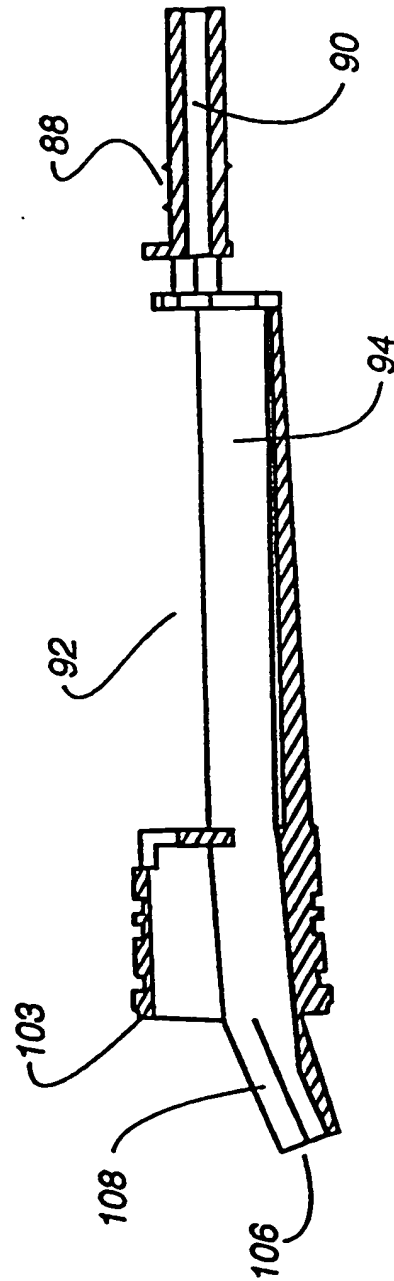


**Fig. 7**

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**Fig. 9**



**Fig. 10**

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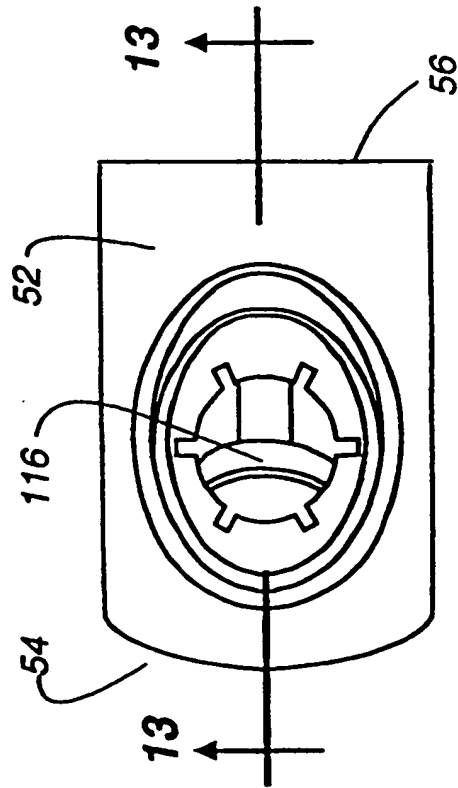


Fig. 12

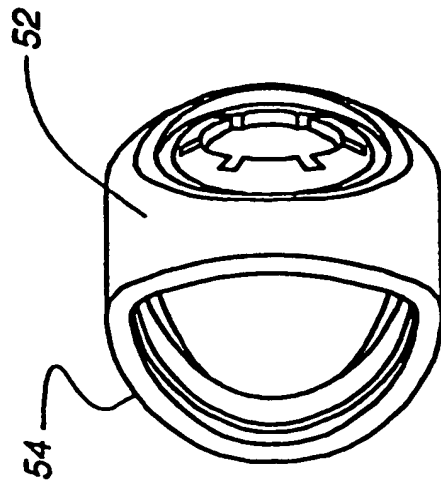


Fig. 11

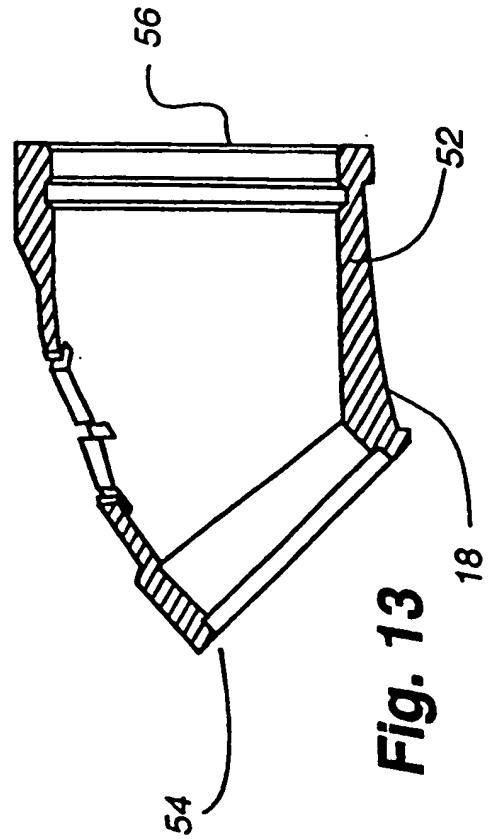
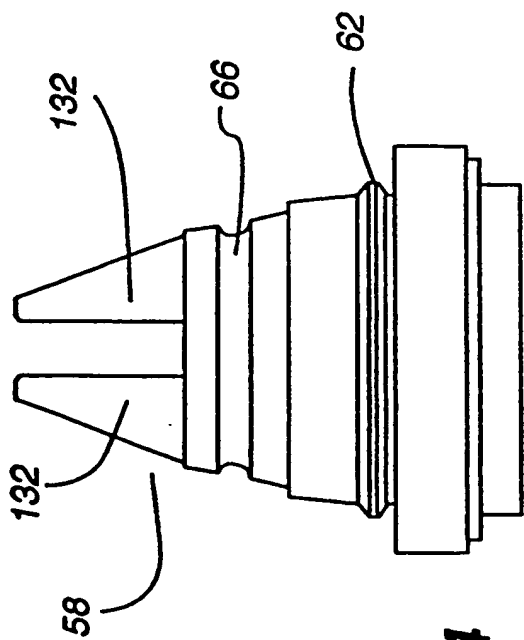


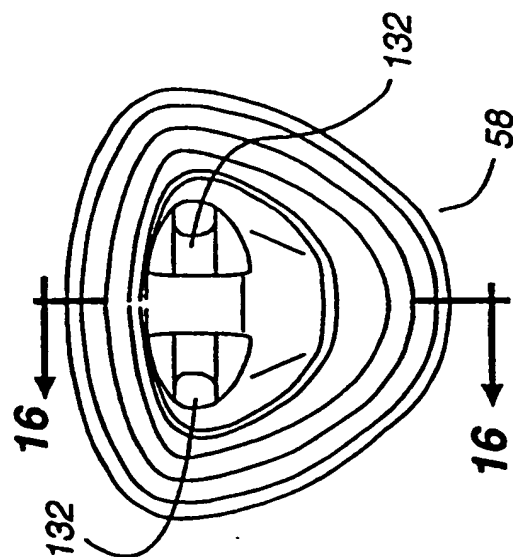
Fig. 13



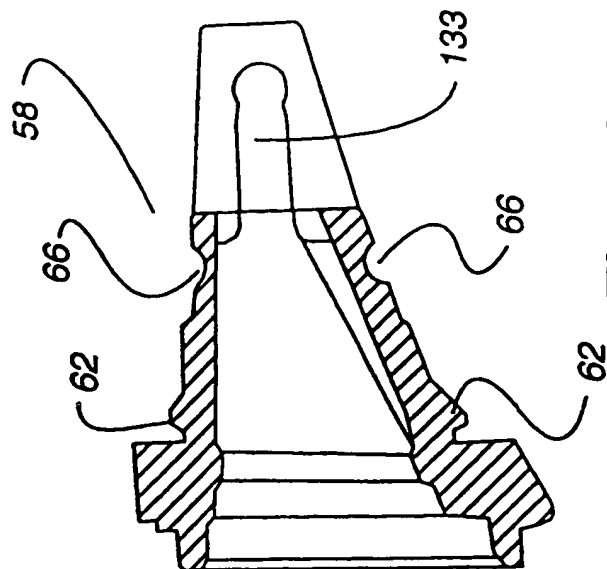
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**Fig. 14**



**Fig. 15**



**Fig. 16**

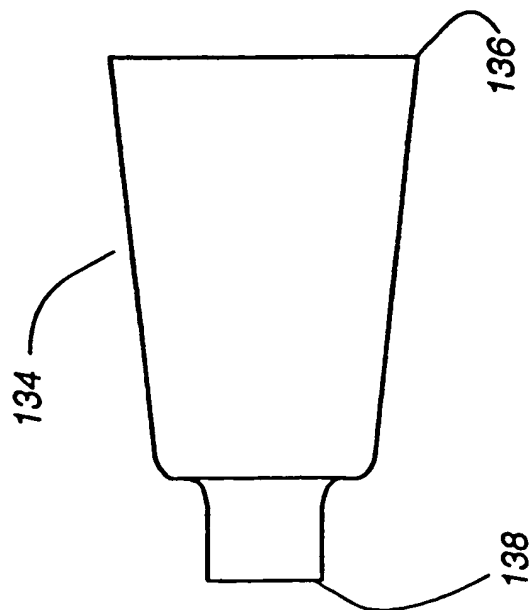


Fig. 17

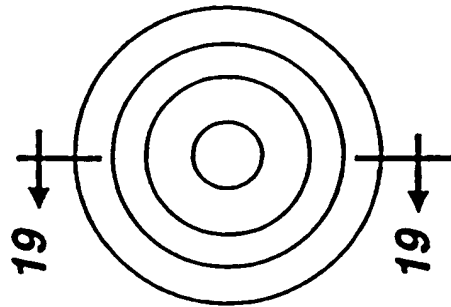


Fig. 18

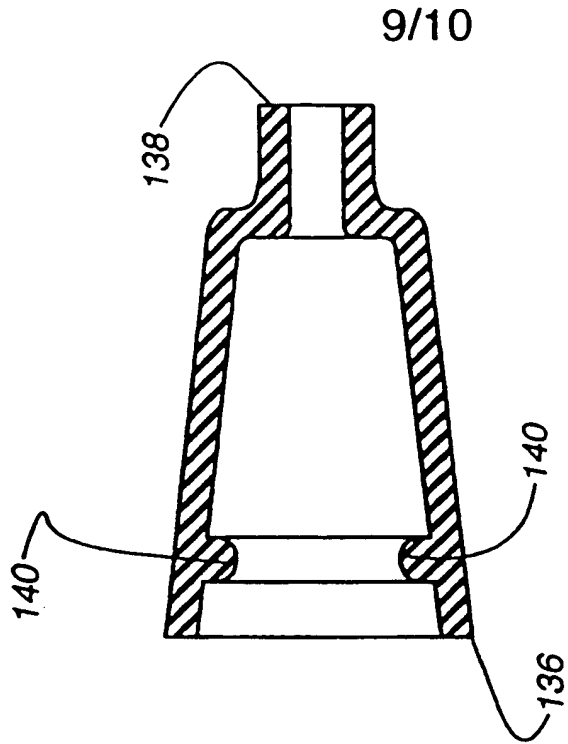


Fig. 19

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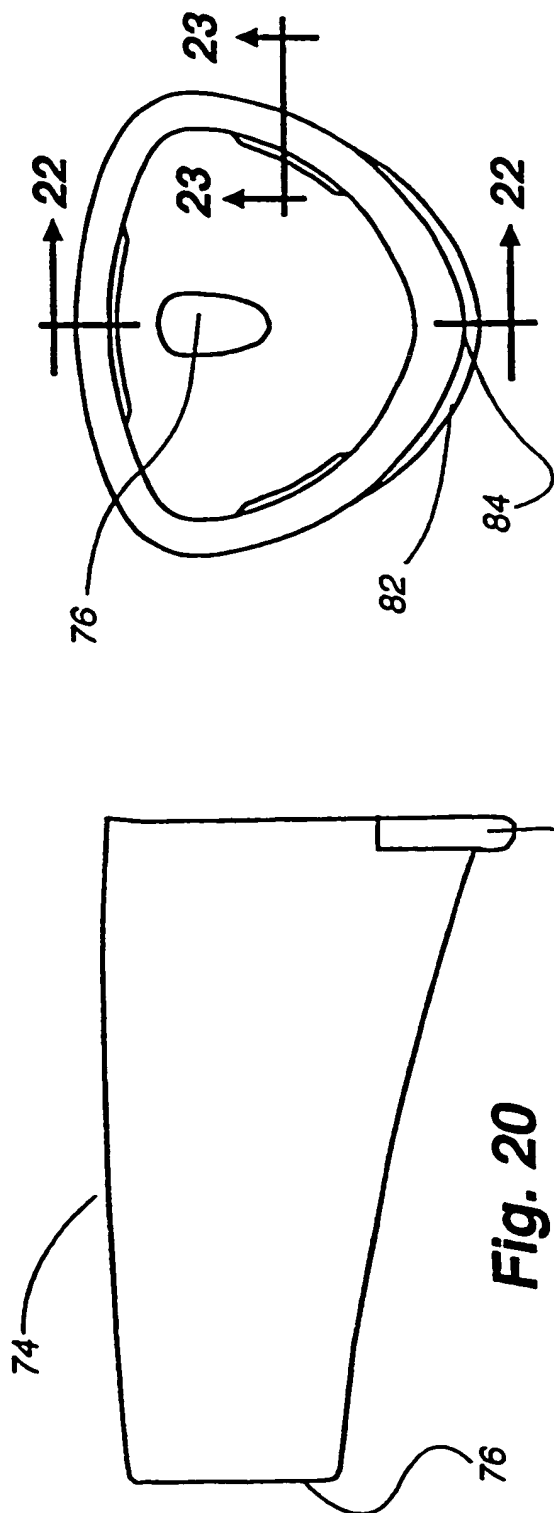


Fig. 21

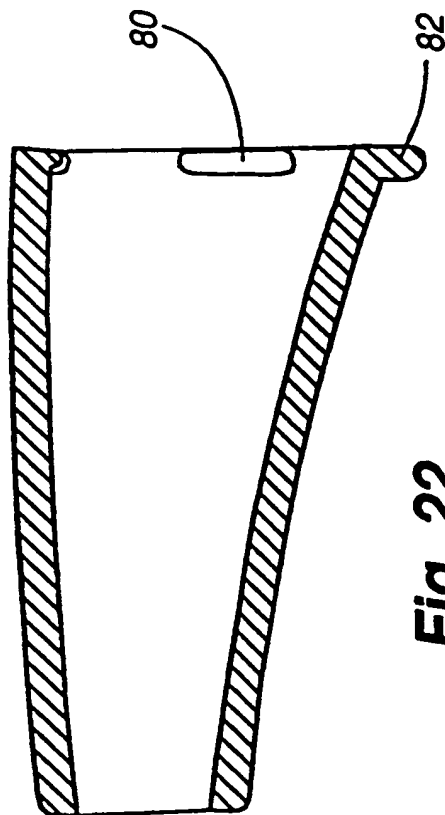


Fig. 22

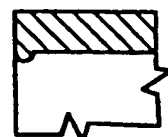


Fig. 23

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US00/35192

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61C 1/07

US CL : 433/118

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 433/118, 116, 119, 142, 143, 82, 125; 132/322

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST, search terms: floss\$4, tip, handle, power, motor, dental

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,219,619A (ZAROW) 26 August 1980, figures 1 and 6.	15-17, 19
—		-----
Y		1-14, 18
Y	US Des.370,125A (CRAFT et al.) 28 May 1996, figures 1 and 4	4, 18
Y	US 5,931,170A (WU) 3 August 1999, figures 1-3.	5, 8, 10-12
Y,P	US 6,095,811A (STEARNS) 1 August 2000, figures 1-3	5, 10, 11, 13, 14
Y	US 5,787,908A (ROBINSON) 4 August 1998, figure 3	6
A	US 5,606,984A (GAO) 4 March 1997, figures 1 and 3.	1-4, 7, 9, 15-19

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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Date of the actual completion of the international search

26 FEBRUARY 2001

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